

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION**

NCS MULTISTAGE INC.
NCS MULTISTAGE LLC.,

Plaintiffs,

v.

TCO AS,

Defendant.

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CIVIL ACTION NO. 6:20-cv-00622-ADA

DEFENDANT TCO AS'S RESPONSE TO PLAINTIFFS' OPENING CLAIM
CONSTRUCTION BRIEF

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I. INTRODUCTION

Pursuant to the Court's Scheduling Order (Dkt. 45), and in view of the parties March 26, 2021 meet and confer, Defendant TCO AS ("TCO AS") submits its responsive claim construction brief in support of its proposed construction of the disputed claim terms in U.S. Patent No. 10,465,445 (the "'445 Patent"). The asserted claims of the '445 Patent recite claim language that is contradictory to NCS's offered constructions, and indefinite. As such, TCO AS proposes constructions consistent with the plain and ordinary meaning of the terms and the intrinsic record. If adopted by the Court, TCO AS's proposed constructions will aid the factfinder by explaining the ordinary meaning of various claim terms to a person of ordinary skill in the art at the time of the invention, in view of the specification. Accordingly, TCO AS requests that the Court adopt TCO AS's proposed claim constructions for the disputed terms.

II. TECHNOLOGY

The '445 Patent discloses a float tool for use in casing flotation. Casing flotation, developed in the 1980s, is a well-known, proven technology that uses flotation equipment to extend the lateral reach of a horizontal or highly deviated wellbore with reduced construction costs and environmental impact. (Ex. 1, Rogers, H., et al., *Buoyancy Assist Extends Casing Reach in Horizontal Wells*, *Society of Petroleum Engineers*, SPE 50680, Published 1998 ("Rogers"). Casing flotation overcomes the friction between the wellbore and the casing that causes the casing to become stuck in extended-reach horizontal wells. Ex. 1, Rogers at 1-3. Extended-reach drilling with casing flotation is currently the most economical and common approach to reaching additional reserves and is the standard throughout the world.

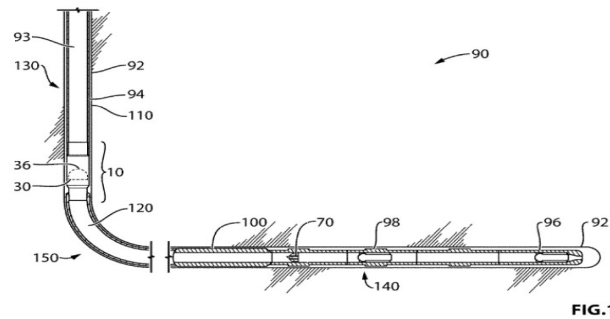
Casing flotation uses an air chamber created near the lower end of the casing string sealed with retrievable plugs that creates a buoyant effect, reducing the casing weight, and resulting in less drag between the casing and the formation. Ex. 1, Rogers at 1-2. Eventually, rupture disc assemblies

designed to rupture when the disc is exposed to a sufficient force or pressure were used in place of retrievable plugs to seal the floatation chamber, which reduced the associated costs associated with retrieving the plug. *Id.*

Plugs have been well-known for use as seals in wellbore operations for a variety of applications, including floatation, production, diversion, cementing, fracturing, etc. (Ex. 17, April 23, 2021 Declaration of Dr. Neal Adams (“Adams Decl.”) at ¶ 36-47). These plug created seals that required removal from the casing string after the relevant wellbore operation was performed, typically by wireline retrieval, explosives, or drilling out. *Id.* at ¶ 43. However, removal techniques that relied on explosives were expensive and could damage the casing while those that relied on wireline run into the casing to retrieve, actuate, and/or other remove the plug were costly and time consuming that risked gelling of the drill fluid. *Id.*

III. ’445 PATENT DISCLOSURE

The ’445 Patent “relates to a method and apparatus for sealing well casings.” Ex. 2, ’445 Patent at 1:16-17. The ’445 Patent explains that a problem in the prior art was that for many float techniques and devices, it may not be possible to restore full casing inside diameter (ID). *Id.* at 1:47-49. The ’445 Patent thus describes a “float chamber” or a “buoyant chamber” where “parts of the float chamber could be easily removed from the wellbore and/or that the removal could result in full casing ID.” *Id.* at 1:56- 67. Figure 1, reproduced below, depicts an embodiment of a float tool, where a rupture disc assembly 10 installed in the vertical portion of the wellbore with buoyant chamber 120. *Id.* at 4:6-10 and 5:27-48.



Ex. 2, '445 Patent at Fig. 1. The '445 Patent further describes that the rupture “disc may be engaged within the casing string by a securing mechanism,” such as a shear ring 44, which “provides for seating rupture disc 30 in lower tubular member 18, and acts as a disengagable constraint.” *Id.* at 2:10-11, 8:44-62, Figs. 2-3. The '445 Patent also discloses that the “[r]upture disc assembly 10 forms a temporary isolation barrier, isolating a fluid-filled, upper section of the string 93 from a sealed, buoyant chamber 120 formed in the string between the rupture disc assembly 10 and a sealing device, such as a float shoe 96 disposed at the lower end of the casing string.” *Id.* at 4:19-24.

After the casing has run and landed, the “rupture disc is then burst by pressuring the casing from the surface.” *Id.* at 6:24-26. According to the '445 Patent, “[r]upture disc assembly 10 provides a way for a sealed casing string to become unsealed while requiring less hydraulic pressure than prior art rupture disc approaches. This is because the presence of shear ring 44 (or other securing mechanism) allows pressure to be built up against the upper surface 38 of the rupture disc until the point is reached at which shear ring suddenly gives way. The resulting sudden downward impulse experienced by the rupture disc causes it to forcefully impact on the impact surface of the lower tubular.” *Id.* at 11:27-33; *see also id.* at 11:46-48 (“the impact force on rupture disc 30, combined with the hydraulic pressure, accomplish the breaking of rupture disc.”).

IV. PERSON OF ORDINARY SKILL IN THE ART

For the subject matter of the '445 Patent, a person of ordinary skill in the art at the time of the alleged invention ("POSA") is a person with a Bachelor's degree, Master's degree, and/or Ph.D. in Mechanical Engineering or Petroleum Engineering, or at least five years of experience working with plugs and floatation of well casing.

V. DISPUTED TERMS

A. "Sealed Chamber" (Claims 8, 14, 22, 36, 40, 42, 46, and 50)

NCS Proposed Construction	TCO AS
Plain and ordinary meaning	Substantially fluid-tight chamber where the rupture disc forms an upper seal of the chamber, a float device forms a lower seal of the chamber, and a casing string there between.

TCO AS's construction is proper because the term "sealed chamber" does not have a plain and ordinary meaning. As such, NCS's proposal does not provide the Court with any guidance as to what the terms mean. Moreover, NCS misguidedly tells the Court "[a] POSITA can easily explain the term to the jury." Dkt. 67, p. 8. The ultimate question of claim construction is a legal one, and the Court instructs a jury on what a claim term means, not a POSITA. *Sulzer Textil A.G. v. Picanol N.V.*, 358 F.3d 1356, 1366 (Fed. Cir. 2004) ("[T]he district court must instruct the jury on the meanings to be attributed to all disputed terms used in the claims in suit so that the jury will be able to 'intelligently determine the questions presented.'" (citation omitted)); *see also Every Penny Counts, Inc. v. Am. Express Co.*, 563 F.3d 1378, 1383 (Fed. Cir. 2009) ("[T]he court's obligation is to ensure that questions of the scope of the patent claims are not left to the jury. In order to fulfill this obligation, the court must see to it that disputes concerning the scope of the patent claims are fully resolved." (citation omitted)). Generally, the words, phrases and terms in patent claims should receive their ordinary and accustomed meaning. *Phillips v. AWN Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (en banc). However, a patentee "may choose to be his own lexicographer and use

terms in a manner other than their ordinary meaning, as long as the special definition of the term is clearly stated in the patent specification or file history.” *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996).

NCS chose to be its own lexicographer and its attempt to broaden the scope of the claims of the ’445 Patent are transparent. The ’445 Patent specification teaches that the sealed chamber as “[r]upture disc assembly **10** forms a temporary isolation barrier, isolating a fluid-filled, upper section of the string **93** from a sealed, buoyant chamber **120** formed in the string between the rupture disc assembly **10** and a sealing device, such as a float shoe **96** disposed at the lower end of the casing string.” Ex. 2, ’445 Patent at 4:19-24. The specification further teaches that a float device, such as a float shoe or float collar, forms the lower boundary of the sealed chamber. *Id.* at 4:25-30.

Contrary to NCS’s assertions, TCO AS’s proposed construction does not exclude any specific embodiment from the specification. Tellingly, NCS failed to identify which embodiment TCO AS’s proposed construction purportedly excludes and NCS’s reliance on *Oatey Co. v. IPS Corp.*, 514 F.3d 1271, 1276 (Fed. Cir. 2008) is misplaced. (*see* Dkt. 67, pp. 8-9.) The Federal Circuit has repeatedly recognized that *Oatey* is not a panacea requiring claims to be construed more broadly than written. *SIMO Holdings Inc. v. Hong Kong uCloudlink Network Tech. Ltd.*, 983 F.3d 1367, 1378–79 (Fed. Cir. 2021). As discussed above, TCO AS’s proposed construction is consistent with the specification. Accordingly, the Court should construe “sealed chamber” to mean “substantially fluid-tight chamber where the rupture disc forms an upper seal of the chamber, a float device forms a lower seal of the chamber, and a casing string there between.”

B. “within the upper and lower ends” (Claims 1, 8, 14 – 15, 22 – 25, 27 – 29, 36 – 43, 46, 50 – 53, and 55 – 57)

NCS Proposed Construction	TCO AS
Plain and ordinary meaning:	Inside of the upper and lower ends

NCS Proposed Construction	TCO AS
Between the upper and lower ends	

TCO AS’s construction is proper because the term “within the upper and lower ends” does not have a plain and ordinary meaning, and the parties actively dispute the scope of this term. *O2 Micro International, Ltd. v. Beyond Innovation Technology Co.*, 521 F.3d 1351, 1361 (Fed. Cir. 2008) (reasoning that when the parties raise an actual dispute regarding the proper scope a claim, the court must resolve that dispute). Yet again, NCS’s proposal of plain and ordinary meaning provides the Court with no guidance on disputed claim scope, and invites legal error. *Id.* at 1362. Adopting, NCS’s proposal leaves the question of claim scope unanswered, thus leaving it for the jury to decide the claim scope of “within the upper and lower ends”, which is improper.

Here, a POSA would understand that “within the upper and lower ends” means “*inside* the upper and lower ends,” not “*between*” the upper and lower ends as argued by NCS. *See* Dkt. 67, p. at 7 ([Within] describes the location of the disc...that is, somewhere within (or between) the upper and lower ends...). The specification of the ’445 Patent supports TCO AS’s construction. For example, the specification states that “[t]he rupture disc is secured above or within the lower tubular member such that the rupture disc can move downward into a constricted area of the lower tubular member in response to hydraulic fluid pressure, and rupture as a result of the impact against the lower tubular member.” Ex.2, ’445 Patent at 2:54-58; *see also* 7:17-21 (“The rupture disc is ruptured by engagement against a region of the casing string (hydraulic pressure shears the engagement of the rupture disc within the one or more tubular, allowing the disc to move downward and shatter).”). Further, the extrinsic evidence supports TCO AS’s construction. According to Webster’s II New

College Dictionary, Third Edition (2005), (“Webster’s”), “within” is defined as “in or into the inner part: inside...an inner position, place or area.” (Ex. 3, Webster’s, TCO1060-1062 at 1062).

NCS’s proposal, by contrast, seeks to rewrite the term “within” to mean “between.” This proposal is unsupportable. Within and between are not synonyms (*See Id.*) Further, the claims of the ’445 Patent use the term “between” and “within” in the same claim, which supports that they clearly mean different things. Claim 1, for example, recites “A float tool configured for use in a casing string...the casing string having an internal diameter that defines a fluid passageway **between** an upper portion of the casing string and a lower portion of the casing string... “a rupture disc having a rupture burst pressure and ...in sealing engagement with a region of the tubular member **within** the upper and lower ends...” Ex. 2, ’445 Patent at 14:06-16 (emphasis added). Different claim terms words are presumed to have different meaning. *CAE Screenplates Inc. v. Heinrich Fiedler GmbH & Co. KG*, 224 F.3d 1308, 1317 (Fed. Cir. 2000). Thus, within the upper and lower ends cannot mean between the upper and lower ends as proposed by NCS.

Additionally, NCS’s position is contrary to the evolution of the claim language during patent prosecution. During the prosecution of the ’445 Patent, NCS amended the language of the claims to overcome the Examiner’s rejection to add that the rupture disc is “in sealing engagement with a reation of the tubular member within the upper and lower ends.” (*See* Ex. 4, p. 3 Response to June 6, 2018 Office Action). The patentee considered it necessary to add the claim language to traverse the Examiner’s rejections, but is now attempting to re-write the claim language to mean something else. Thus, the Court should reject NCS’s proposed construction. Here, the intrinsic and extrinsic evidence support TCO’s proposed construction—that a POSA would understand that “within the upper and lower ends” means “inside of the upper and lower ends.”

C. The Preamble, “A float tool configured for use in positioning a casing string in a wellbore...the casing string having an [ID]” is limiting (Claims 1, 28, 30, and 31)

NCS Proposed Construction	TCO AS
No construction necessary, as the preamble is not limiting	The preamble is limiting because when read in the context of the entire claim, the preamble either recites limitations of the claim, or, is necessary to give life, meaning, and vitality to the claim limitations.

The preamble of the claims is a limitation to the invention because “it recites essential structure” and/or “is necessary to give life, meaning, and vitality to the claim.” *Shoes by Firebug LLC v. Stride Rite Children’s Grp., LLC*, 962 F.3d 1362, 1367 (Fed. Cir. 2020) (internal citations omitted.) The Federal Circuit has held that the “dependence on a particular disputed preamble phrase for antecedent basis may limit claim scope because it indicates a reliance on both the preamble and claim body to define the claimed invention.” *Id.* Here, an examination of the claims at issue directly disproves NCS’s assertion that “[t]here is nothing in this preamble that qualifies as essential structure or steps necessary to understand the claims.” (Dkt. 67 at 9). The preamble of the ’445 Patent is limiting because the body of the claims 1, 28, 30, and 31 rely on the preamble for antecedent basis for the phrase “casing string.” *Shoes by Firebug LLC*, 962 F.3d 1362 at 1368 (holding that the preamble of one of the asserted patents was limiting because the preamble was essential to understanding the structural limitations of the claimed system.)

Also, the preamble is limiting because it defines essential structure that ultimately lead to the allowance of the claims. During prosecution, the Examiner and NCS relied on the limitation that the ID of the disc attachment is larger and parallel to the ID of the casing to get the claims allows. *See* Ex. 5, (Notice of Allowance). The structure for this limitation is defined in the preamble. Indeed, without the preamble, the claim would not make sense or address the very problem that the claimed invention purports to address—restoring the ID of the casing. *See supra* Section III.

Because the claim drafters chose to use both the preambles and the body of the claims to define the subject matter of the claimed invention, and the preamble brings live and meaning to the body of the claims, the preambles should be construed as limiting.

D. Method Claims 22 and 50 Violate *IPXL*

Claims 22 and 50 are indefinite under 35 U.S.C. § 112 because they recite both a method for using an apparatus and an apparatus. Section 112 requires that a patent specification “conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.” 35 U.S.C. § 112. The Supreme Court has read this provision to require that “a patent’s claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014). The Federal Circuit has made clear that “a single claim covering both an apparatus and a method of use of that apparatus” fails to meet the requirements of § 112 because “it is unclear whether infringement ... occurs when one creates a[n infringing] system, or whether infringement occurs when the user actually uses [the system in an infringing manner].” *IPXL Holdings, LLC v. Amazon.com, Inc.*, 430 F.3d 1377, 1384 (Fed. Cir. 2005). Thus, a claim is unequivocally indefinite if it does not reasonably apprise those skilled in the art of its scope. This claim drafting/examination/construction principle is well recognized and has been incorporated into the Patent Office’s *Manual of Patent Examination Procedure* § 2173.05(p)(II) (2020) (“A single claim which claims both an apparatus and the method steps of using the apparatus is indefinite under 35 U.S.C. 112, second paragraph.”); *see also* Robert C. Faber, *Landis on Mechanics of Patent Claim Drafting* § 60A (2001) (“Never mix claim types to different classes of invention in a single claim.”).

1. The Method Claims 22 and 50 Recite Both Method Steps and Apparatus Limitations

The method claim 22 and 50 improperly require both method steps and apparatus limitations, making it unclear when infringement occurs. NCS asserts that claims 22 and 50 are simple method

claims that recite structures used in the performance of the method steps, and “[t]he description of a structure used to perform the method gives meaning to the method.” Dkt. 67, p. 10. NCS relies on *Microprocessor Enhancement Corp. v. Texas Instruments Inc.*, 520 F.3d 1367, 1374 (Fed. Cir. 2008), to support its position, but NCS misreads and misapplies the Federal Circuit’s ruling in that case. The Federal Circuit in *Microprocessor Enhancement Corp.*, disagreed with the lower court’s reasoning because it concluded that the patentee’s use of an unconventional preamble within a preamble structure did not render the claim indefinite. The Federal Circuit said that the method claim at issue could generally be described as follows:

1. A method of executing instructions in a pipelined processor comprising:
[structural limitations of the pipelined processor];
the method further comprising:
[method steps implemented in the pipelined processor].

Id. at 1374. The Federal Circuit held that preamble within a preamble structure was unconventional but it was no different from reciting physical structure in the preamble of the method claim. *Id.* However, that is far different from what the NCS did in this case. Here, NCS did not use the unconventional preamble within a preamble structure like in *Microprocessor Enhancement Corp.* Claims 22 and 50 only include one preamble: “A method for installing casing in a wellbore containing a well fluid and having an upper vertical portion, a lower horizontal portion, and a bend portion connecting the upper and lower portions, the method comprising,” not the preamble within a preamble structure used in *Microprocessor Enhancement Corp.*

Further, a plain reading of the claim language of method claims 22 and 50 lead to the conclusion that those claims as issued result in the combination of two separate statutory classes of invention. Ex. 6, Color Coded Issued Method Claims 22 and 50 (preamble **blue**; method step **green**; apparatus limitation **red**). These claims are ambiguous, and a manufacturer or seller of the claimed apparatus, a rupture disc assembly as set forth in the apparatus claim 1, *see* Ex. 1, ’445 Patent at

14:11-23, would not know from claims 22 or 50 whether it might also be liable for contributory infringement because a buyer or user of the apparatus later performs the claimed method of using the apparatus. That is the very situation that TCO AS finds itself in this lawsuit. NCS has accused TCO of contributory infringement, but when does that alleged contributory infringement occur—when TCO AS creates the alleged apparatus (e.g., a rupture disc assembly), or when a customer uses the apparatus and “runs a casing string into the wellbore” and “floats at least a portion of the casing string . . .”? The ambiguity is unavoidable and NCS can only fault itself for seeking the issuance of a single claim covering both an apparatus and a method of use. Method claims 22 and 50 are “not sufficiently precise to provide competitors with an accurate determination of the ‘metes and bounds’ of protection involved” and are invalid pursuant to the Federal Circuit precedent flowing from *IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1384 (Fed. Cir. 2005).

2. The Prosecution History Confirms Invalidity for Mixing Two Statutory Classes of Invention

The prosecution history of the ’445 Patent solidifies the invalidity of the claims because it shows patentee’s intent to submit for examination and ultimate issuance a single claim covering both an apparatus and a method of use of that apparatus. In the original application for the ’445 Patent, the patentee submitted for examination original method claim 25

25. A method for installing casing in a wellbore containing a well fluid and having an upper portion, a lower horizontal portion, and a bend portion connecting the upper and lower portions, the method comprising:

running a casing string into the wellbore comprising a chamber sealed on an upper end thereof by a rupture disc and on a lower end thereof by a lower seal; and

floating at least a portion of the casing string containing the sealed chamber in the well fluid in the lower portion of the wellbore.

Ex. 7, ’445 Patent File History Appl. No. 15/919,370 at pg. 316. The examiner rejected the original claim 25 on several grounds: (1) anticipated by “Buoyancy Assist Extends Casing Reach in Horizontal Well” by Rogers, *et al.*; and (2) non-statutory double patenting over a copending

application, and previously issued patent. Ex. 13 at pgs. 6 and 11. In response to the rejections, the patentee amended original (method) claim 25 to include the rupture disc structure, which mimicked the amended original (apparatus) claim 1 to include the identical rupture disc structure.

25. (Currently Amended) A method for installing casing in a wellbore containing a well fluid and having an upper vertical portion, a lower horizontal portion, and a bend portion connecting the upper and lower portions, the method comprising:

running a casing string into the wellbore, the casing string having a full casing internal diameter that defines a fluid passageway between an upper portion of the casing string and a lower portion of the casing string, the upper and lower portions of the casing string separated by comprising a chamber sealed on an upper one end thereof by a rupture disc assembly and on a lower an opposing end thereof by a lower seal, the chamber containing a first fluid having a first specific gravity

wherein the rupture disc assembly comprises (i) a tubular member having an upper end and a lower end, the upper and lower ends connected in-line with the casing string and (ii) a rupture disc having a rupture burst pressure and in sealing engagement with a region of the tubular member within the upper and lower ends, wherein the rupture disc is configured to rupture when exposed to a rupturing force greater than the rupture burst pressure and the region of the tubular member has an internal diameter not less than the full casing internal diameter upon rupture of the rupture disc; and

floating at least a portion of the casing string containing the sealed chamber in the well fluid in the lower horizontal portion of the wellbore.

1. (Currently Amended) A float tool configured for use in a casing string for a wellbore containing a well fluid, the casing string having a full casing internal diameter that defines a fluid passageway between an upper portion of the casing string and a lower portion of the casing string, and having an upper substantially vertical portion, a lower substantially horizontal portion, and a bend portion connecting the upper and lower portions; the float tool comprising:

a rupture disc assembly comprising (i) a tubular member having an upper end and a lower end, the upper and lower ends configured for connection in-line with the casing string and (ii) a rupture disc having a rupture burst pressure that is greater than a fluid pressure imposed on the rupture disc by a fluid above the rupture disc sufficient to run the casing string into the lower, substantially horizontal portion of the wellbore and in sealing engagement with a region of the tubular member within the upper and lower ends,

wherein the rupture disc is configured to rupture when exposed to a rupturing force greater than the rupture burst pressure and the region of the tubular member has an internal diameter not less than the full casing internal diameter upon rupture of the rupture disc.

Ex. 4, Response to Office Action Mailed June 6, 2018, at pgs. 3, and 6-7 (emphasis added). In the submitted remarks, NCS argued around the Rogers anticipation rejection by identifying what he considered distinguishing structure from that disclosed in the prior art by stating that:

Independent claims 1 and 25 generally recite the feature of a rupture disc assembly for use in a casing string having a full casing internal diameter and comprising a tubular member and a rupture disc having a rupture burst pressure and in sealing engagement in a region of the tubular member

Applicant respectfully submits Rogers does not disclose or suggest a rupture disc in sealing engagement in a region of tubular member where the region of the tubular member has an internal diameter not less than the full casing internal diameter of the casing string upon rupture of the rupture disc. In particular, as shown in Figures 8 and 9, the rupture disc in Rogers is in sealing engagement in a region of a tubular member. However, such region of the tubular member has an internal diameter substantially smaller than the full casing internal diameter of the casing string upon rupture of the rupture disc.

Therefore, since each and every limitation of independent claims 1 and 25 are not disclosed or suggested in Rogers, claims 1 and 25 are not anticipated by Rogers.

Ex. 4, at pgs. 13-14 (emphasis in original and highlighting added). NCS never discussed how the amended method claim was distinguishable over the prior art based on the “running a casing string”

or “floating at least a portion of the casing sting” limitations of the method claim. NCS relied on the recitation of rupture disc structure in the claims because the patentee intended to include that structure in the both the apparatus and method claims to get around the Rogers prior art reference. NCS’s assertion that it used the common way of writing method claims by including structure is contrary to its prosecution history argument that the prior art lacked the sealing engagement in a region of the tubular member that has full casing internal diameter. The rupture disc sealing engagement structure is not the structure used to perform the claimed method steps of “running a casing string” or “floating at least a portion of the casing sting.”

NCS also sought the issuance of a single claim covering both an apparatus and a method of use of that apparatus for the alternative embodiment of a rupture disc disengaging from the sealing engagement. In the same response to office action, NCS submitted new apparatus claim (32) and new method claim (54), both of which included identical rupture disc structure.

<p>32. (New) A float tool configured for use in positioning a casing string in a wellbore containing a well fluid, the casing string having a full casing internal diameter that defines a fluid passageway between an upper portion of the casing string and a lower portion of the casing string, the float tool comprising:</p> <p>a rupture disc assembly comprising (i) a tubular member having an upper end and a lower end, the upper and lower ends configured for connection in-line with the casing string and (ii) a rupture disc having a rupture burst pressure and in sealing engagement with a region of the tubular member within the upper and lower ends,</p> <p>wherein the rupture disc is configured to disengage from sealing engagement when exposed to a pressure greater than a hydraulic pressure in the casing string after the casing string has been positioned in the wellbore and the region of the tubular member has an internal diameter not less than the full casing internal diameter upon disengagement of the rupture disc.</p>	<p>54. (New) A method for installing casing in a wellbore containing a well fluid and having an upper vertical portion, a lower horizontal portion, and a bend portion connecting the upper and lower portions, the method comprising:</p> <p>running a casing string into the wellbore, the casing string having a full casing internal diameter that defines a fluid passageway between an upper portion of the casing string and a lower portion of the casing string, the upper and lower portions of the casing string separated by a chamber sealed on one end by a rupture disc assembly and on an opposing end by a seal, the chamber containing a first fluid having a first specific gravity</p> <p>wherein the rupture disc assembly comprises (i) a tubular member having an upper end and a lower end, the upper and lower ends connected in-line with the casing string and (ii) a rupture disc having a rupture burst pressure and in sealing engagement with a region of the tubular member within the upper and lower ends,</p> <p>wherein the rupture disc is configured to disengage from sealing engagement when exposed to a pressure greater than a hydraulic pressure in the casing string after the casing string has been positioned in the wellbore and the region of the tubular member has an internal diameter not less than the full casing internal diameter upon disengagement of the rupture disc; and</p> <p>floating at least a portion of the casing string containing the sealed chamber in the well fluid in the lower horizontal portion of the wellbore.</p>
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Ex. 4, at pgs. 7-8, and 11 (emphasis added). NCS addressed the purported inventive concept of the new claims by stating that:

New independent claims 32 and 54 generally recite the feature of a rupture disc assembly for use in a casing string having a full casing internal diameter and comprising (i) a tubular member and (ii) a rupture disc in sealing engagement with a

region of the tubular member, The publications cited by the Examiner neither disclose nor suggest such a feature.

Ex. 4, at pg. 16. After receiving NCS's Response to the First Office Action, the Examiner issued a final rejection of amended claims 1 and 25 as anticipated by Rogers, Ex. 8, Final Office Action Mailed Dec. 11, 2018, at pgs. 3-5, and 11, and further rejected amended claims 1 and 25, and new claims 32 and 54, as obvious over Rogers in view of U.S. Patent No. 5,479,986 ("Gano"). Ex. 8, at pgs. 8-12. The Examiner cited Gano for the sealing engagement embodiment of new claims 32 and 54. Ex. 8, at pgs. 9 and 11-12. In response to the Examiner's Final Rejection, the patentee made identical amendments to the rupture disc structure recited in amended claims 1 and 25 and new claims 32 and 54, regardless of their statutory classification as either an apparatus or a method claim.

Patentee Feb. 13, 2019 Amendments to Apparatus Claims	
Claim 1	force greater than the rupture burst pressure and the region of the tubular member <u>where the rupture disc is attached</u> has <u>an a larger internal diameter not less than the internal diameter of the casing string full casing internal diameter upon rupture of the rupture disc.</u>
Claim 32	casing string has been positioned in the wellbore and the region of the tubular member <u>where the rupture disc is attached</u> has <u>an a larger internal diameter not less than the internal diameter of the casing string full casing internal diameter upon rupture of the rupture disc.</u>
Patentee Feb. 13, 2019 Amendments to Method Claims	
Claim 25	<u>where the rupture disc is attached</u> has <u>an a larger internal diameter not less than the internal diameter of the casing string full casing internal diameter upon disengagement of the rupture disc.</u>
Claim 54	<u>where the rupture disc is attached</u> has <u>an a larger internal diameter not less than the internal diameter of the casing string full casing internal diameter upon disengagement of the rupture disc;</u> and

Ex. 9, Response to Office Action Mailed Dec. 11, 2018, at pgs. 2, 5-6, and 10 (highlighting added).

To confirm the intent to include the rupture disc structure in the method claims to traverse the Rogers anticipation rejection, NCS, in the remarks, argued that:

Rogers does not disclose or suggest a rupture disc in sealing engagement and attached to a region of a tubular member having a larger internal diameter than the internal diameter of the casing string. . . . Therefore, since each and every limitation of independent claims 1 and 25 are not disclosed or suggested in Rogers, claims 1 and 25 are not anticipated by Rogers.

Ex. 9, at pg. 12 (emphasis added). When addressing the obviousness rejection of claims 1, 25, 32, and 54, NCS again focused on the rupture disc assembly structure being sealing engaged to a region of the tubular member having a larger internal diameter than the internal diameter of the casing string to distinguish the claims from the prior art rejection.

Independent claims 1, 25, 32 and 54 are directed to an apparatus for use in a casing string and a method for installing casing string in wellbore and generally recite the feature of a rupture disc assembly comprising a tubular member and a rupture disc having a rupture burst pressure and in sealing engagement with a region of the tubular member and wherein the region of the tubular member where the rupture disc is attached has a larger internal diameter than the internal diameter of the casing string.

The deficiencies of Rogers with respect to this feature are discussed above. Adding Gano to Rogers does not make up for Rogers' deficiencies to render independent claims 1, 25, 32 and 54 obvious. In particular, Gano also does not teach or suggest a rupture disc in sealing engagement with and attached to a region of a tubular member having a larger internal diameter than the internal diameter of the casing string. . . .

Therefore, since each and every limitation of independent claims 1, 25, 32 and 54 are not disclosed or suggested in Rogers combined with Gano, claims 1, 25, 32 and 54 are not rendered obvious by Rogers combined with Gano.

Ex. 9, at pg. 13 (emphasis added). Dissatisfied with the Final Rejection of the '445 Patent application, NCS filed a Request for Continued Examination ("RCE"); however, the Examiner maintained the rejection of claims 1, 3-8, 10-20, 23-29, 31-50, and 52-61 as obvious in view of Rogers and Gano. Ex. 10, Office Action after RCE Mailed Mar. 11, 2019, at pgs. 2, 4-5, and 7. In response to this rejection, NCS only made one identical amendment to the rupture disc structure of claims 1, 25, 32, and 54 regardless of their statutory classification as either an apparatus or a method claim. NCS's structural amendment was to clarify that the region of the tubular member where the rupture disc is attached "is parallel to the internal diameter of the casing string." Ex. 11, Response

to Office Action after RCE Mailed Mar. 11, 2019, at pgs. 2, 5-6, and 9. NCS further confirmed its intent to include this structural limitation in not only the apparatus claims (1 and 32) but also the method claims (25 and 54):

However, independent claims 1, 25, 32 and 54 are distinguished from Rogers combined with Gano since this combination of publications does not teach or suggest a rupture disc in sealing engagement with and attached to a region of a tubular member having a larger internal diameter than the internal diameter of the casing string and parallel to the internal diameter of the casing string.

Ex. 11, at pgs. 11-12. After receiving NCS's response, the Examiner issued a Notice of Non-Compliant Amendment, which required NCS to correct identify the status of claim 42. In its response, NCS corrected the status of claim 42, and submitted the previously made amendments to claims 1, 25, 32, and 54, and offered the identical remarks regarding the distinguishing features of the rupture disc structure over that of the prior art. Ex. 12, Response to Notice of Non-Complaint Amendment June 10, 2019, at pgs. 2, 5-6, 9, and 11-12. After receiving this Response, the Examiner issued a notice of allowably and renumbered the claims for issuance. Ex. 5, Notice of Allowance.

It is clear from the prosecution history of the '445 Patent that it was NCS's intent to submit for examination and ultimate issuance a single claim covering both an apparatus and a method of use of that apparatus. This impermissible mixing of two statutory classes of claims makes the claims indefinite pursuant to Section 112 and *IPXL*.

E. “Rupture burst pressure” (Claims 1, 8, 14 – 15, 22 – 25, 27 – 29, 36 – 43, 46, 50 – 53, and 55 – 57)

NCS Proposed Construction	TCO AS
No construction	a hydraulic pressure sufficient to break the rupture disc (i.e., the pressure at which the disc would break in response to hydraulic pressure alone).

NCS's proposal that the term “rupture burst pressure” requires no construction should be rejected because it ignores the fact that the specification distinguishes between “breaking” and “rupturing” of the rupturing disc. For example, the specification provides that:

[t]here is no need to drop a weight into the casing string to break the disc, for example. Moreover, there can be various configurations of the rupture disc (grooved or etched disc, disc of thinner thickness) to improve the breakability of the disc. This allows the disc to break into suitably sized pieces that will not impair wellbore function.

Ex. 2, '445 Patent at 7:20-25. Accordingly, NCS's proposed "construction" is inconsistent with the breadth of the specification.

F. "Region of the tubular member where the rupture disc is attached...is parallel to the internal diameter of the casing string" (Claims 1, 22, 28, and 50)

NCS Proposed Construction	TCO AS
Plain and ordinary meaning where the plain and ordinary meaning is "in the region of the tubular member, the rupture disc is directly secured to and in sealing engagement with a cylindrical surface that is wider than and parallel to the inner surface of the casing string"	Invalid pursuant to 35 U.S.C. § 112, paragraph 2 because it requires that two features which have no inherent direction must be "parallel."

TCO respectfully submits that this term is indefinite because it requires that two features which have no inherent direction must be "parallel." Accordingly, a POSA would not reasonably understand what the claim term means, or determine if an accused product infringes the claim, rendering the claim indefinite. *See Nautilus Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014) (A claim is indefinite when the claim, "read in light of the specification delineating the patent, and the prosecution history, fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention.") Here, the specification provides no definition of "parallel." Thus, a POSA would understand that the term "parallel" means that two or more items would have the same direction or orientation in a spatial grid. According to the plain and ordinary meaning of "parallel," for two parts to be parallel, they must both have an inherent direction or orientation. (Adams Decl. at 59). Here, the internal diameter of a casing string does not have an inherent direction, and therefore cannot be parallel to the casing string. The internal diameter is a number because it is a scalar property of an object with a circular fluid pathway. (*Id.* at 58-62). As such, a POSA would be

unable to determine if another part was parallel to an internal diameter. *Id.* Because the comparison cannot be determined, a POSA cannot have reasonable certainty as to the scope the claim. Therefore, the term is indefinite.¹

TCO AS is aware that the Court, in the *NCS v. Nine Energy Service, Inc.* (20-cv-00277) litigation, construed this claim to mean “in the region of the tubular member, the rupture disc is directly secured to and in sealing engagement with a cylindrical surface that is wider than and parallel to the inner surface of the casing string.” However, when one substitutes this definition for the claim language, it is evident that the claim term is indefinite:

Substituting claim language with Court’s construction
“...wherein the rupture disc is configured to disengage from sealing engagement when exposed to a pressure greater than a hydraulic pressure in the casing string after the casing string has been positioned in the wellbore and in the region of the tubular member, the rupture disc is directly secured to and in sealing engagement with a cylindrical surface that is wider than and parallel to the inner surface of the casing string. ”

Accordingly, this term is indefinite because it cannot be understood by a POSA with a degree of reasonable certainty.

G. “A Rupturing Force” (Claims 14-15, 22-25, 27, 29, and 56)

NCS Proposed Construction	TCO AS
“a hydraulic pressure or impact force sufficient to rupture the rupture disc”	a hydraulic pressure sufficient to disengage the securing mechanism (i.e., a disengaging pressure);

Contrary to NCS’s assertions, the term “rupturing force” is indefinite because the only plausible definition of the term is results in a nonsensical construction of the claims as a whole and renders the claims inoperative. NCS’s proposed construction should be rejected because it is unsupported in the claims or specification. NCS’s proposed construction also conflicts with NCS’s

¹ The claim language does not identify any particular direction implied by the “attachment region.” Accordingly, a POSA would not know how to determine if it is parallel to the internal diameter, which also lacks an inherent direction. Thus, this portion of the claim is also indefinite.

proposed construction of another term that uses the term “rupturing force.”

The term “rupturing force” is used only once in the specification. Ex. 2, ’445 Patent at 2:1-8. In that single instance, the specification identifies “hydraulic fluid under pressure” as the “rupturing force.” *Id.* At no point does the specification describe “rupturing force” as an “impact force,” and vice versa. The way in which the specification is written, a POSA would understand that “impact force” and “rupturing force” as two separate components of a multi-step process. *See, e.g., Id.* at 10:43-47; 11:45-48.

Here, as in the Nine Energy case, NCS attempts to improperly construe the term “rupturing force” to alleviate the discrepancy of the claim language with the specification and certain embodiments. This is improper. *See, e.g., Oatey Co. v. IPS Corp.*, 514 F.3d 1271, 1276 (Fed. Cir. 2008). Accordingly, the Court should adopt TCO AS’s construction.

H. “the rupture disc is...configured to rupture when exposed to a rupturing force greater than the rupture burst pressure” (Claims 1, 22, 29, 56)

NCS Proposed Construction	TCO AS
the rupture disc can rupture when exposed to a rupturing hydraulic pressure greater than the rupture burst pressure	the rupture disc can rupture when exposed to a hydraulic pressure equal to or greater than the rupture burst pressure.

TCO AS’s proposed construction should be adopted because it takes into account the claim language as supported by the specification. The specification states that “[t]he hydraulic pressure required to cause disruption of the securing mechanism is less than the hydraulic pressure that would normally be required to break the rupture disc.” Ex. 2, ’445 Patent at 2:19-21. As such, if “equal to or greater than” is not part of the definition of this claim term, the construction will be inconsistent with the specification. It is illogical to have a claim state that the only hydraulic pressure needed to rupture the disc is one greater than the rupture burst pressure, when clearly, the specification provides for a hydraulic pressure to disrupt the securing mechanism, thus starting the multi-step

process of rupturing the rupture disc. Accordingly, the claim, read in view of specification, mandates TCO AS's proposed construction.

I. “specific gravity of the well fluid” (Claims 24 and 52)

NCS Proposed Construction	TCO AS
Plain and ordinary meaning	Invalid pursuant to 35 U.S.C. § 112, paragraph 2

“Specific gravity of the well fluid,” as recited in claims 24 and 52, is invalid pursuant to 35 U.S.C. § 112, paragraph 2. At the time of invention, a POSA would understand that “specific gravity” is the ratio of the density of a substance to the density of a standard. (Adams Decl. at 65). Further, a POSA would understand that standards for specific gravities of gasses and liquids are different and incompatible. *Id.* at 65-66. The density and specific gravity of the well fluids can vary depending on the chemicals added. *Id.* A POSA would also understand that the specific gravity of well fluid changes with depth due to changes in pressure, temperature, and the chemicals added to the well fluid at certain points in time. *Id.*

Furthermore, specific gravity is indefinite because a POSA would understand that gasses and liquids have different reference values for specific gravity so their values cannot be directly compared to determine if one is “lower” than the other as recited in claims 24 and 52. Therefore, in light of the specification and the claims of the '445 Patent, a POSA could not determine when the first specific gravity or the fluid in the sealed chamber of the flotation column was less than or lower than the specific gravity of the well fluid, because that density is not a constant value, rendering the term indefinite.

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CERTIFICATE OF SERVICE

I hereby certify that on April 23, 2021, a true and correct copy of the foregoing document was served on all counsel of record via the Court's CM/ECF system per Local Rule CV-5(b)(1).

s/ Jonathan R. Spivey
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